

Date: Monday, 7/16/2007 2:40:47 PM
 User: Kim Johnston

Process Sheet

32

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : 212/205 HIGH FED X-TUBE ASSEMBLY
 Job Number : 33534
 Estimate Number : 10254
 P.O. Number : N/A Part Number : D212664101
 This Issue : 7/16/2007 S.O. No. : N/A Drawing Number : D212-664-141 REV C
 Prsht Rev. : NC Project Number : N/A
 First Issue : N/A Type : LANDING GEAR Drawing Revision : C
 Previous Run : 32678 Material : N/A
 Due Date : 8/5/2007 Qty: 1 Um: Each
 Written By :
 Checked & Approved By :
 Comment : Est Rev:E 04-02-16 Reformat KJ/DS
 Est Rev:F 06-03-29 Remove Comments on Pick List JLM
 Est Rev:G 07-04-30 As per Rev C JLM

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 DC

DOCUMENT CONTROL



KS 07-07-30 ①

Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-101CHG003

E 02/10/10

2.0 D6005128

Crosstube material



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6005-128 Crosstube

B26549

Check OD = 2.750"; ID = 2.000"

J.F. 07/09/24

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA113

2-Turn first side as per Folio FA113

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141.

J.F. 07/09/24

4.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

J.F. 07/09/24

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Part Number: D212664101

Job Number:



Seq. #: Machine Or Operation: Description :

5.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA113

2-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141.

J.F. 07/09/25

6.0 QC1 INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

J.F. 07/09/25

7.0 QC8 SECOND CHECK



Comment: SECOND CHECK

J.F. 07.09.26 (1)

8.0 MORI SEIKI MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

1-Remove sand and plugs

2-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

J.F. 07.09.26 (1)

9.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

JD 7-9-27

10.0 QC5 INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

J.F. 07/09/28

11.0 HAND FINISHING1 HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

SR 7-9-28

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Part Number: D212664101

Job Number:



Seq. #: Machine Or Operation: Description :

12.0 BENDING BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio FT015

EL 7-10-2

13.0 QC15 DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES

7-10-02

14.0 LANDING GEAR 1 LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

SR 7-10-2

JD 7-10-4

15.0 HAND FINISHING1 HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

JD 7-10-4

16.0 QC5 INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

7/10/05

17.0 OUTSIDE SERV.10 OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: 4758

LPI as per ASTM 1417 Level 2

Attach copy of NDT results to work order

7/10/09

18.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

7/10/09 SP

Date: Monday, 7/16/2007 2:40:47 PM
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Process Sheet

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Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 33534

Part Number: D212664101

Job Number:



Seq. #: Machine Or Operation: Description :

19.0 QC6 DIMENSIONAL CHECK



Comment: Inspect for damage & ensure results are as per Dwg D212-664-141

E 07/01/08

20.0 SPRAY PAINTING SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

} *RT 07-10-6*

21.0 QC14 INSPECT SPRAY PAINT



ml 07 10 09



(1)

Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

22.0 D28931 Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2893-1 Support

32779

ml 07/10/09

23.0 D3595 Rubber Cushion (per sq ft)



Comment: Qty.: 0.0840 sf(s)/Unit Total : 0.0840 sf(s)

Rubber Cushion (per sq ft)

.630" X 4.5" 4PCS

Batch: *33833*

ml 07 10 10

24.0 MS2192025 Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-25 Clamp

m104902

ml 07/10/09

Date: Monday, 7/16/2007 2:40:47 PM
User: Kim Johnston

Process Sheet

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Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 33534

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Time: 9:00 am

1-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond

Batch: M104677

Expiry Date: 04/08

ml 07 10 09

2-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb.

ml 07 10 10

26.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

Er 07/10/10

27.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

28.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

PLACARD

Batch: B26249

SP

29.0

AN635A

BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Bolt

Batch: M103446

SO

30.0

AN636A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Bolt

Batch: M104371

SG

31.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total: 18.0000 Each(s)

Washer

Batch: M104745

7/10/10 SO

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Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 33534

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)

Nut

Batch:

M104021

2/10/10

50

33.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

2/10/10

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D212-664-101

REV: C 2/10/10

35.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

2/10/11

Job Completion



U 2/10/10

DART AEROSPACE LTD	Work Order:	33534
Description: Crosstube Assembly (205/212/412 High Fwd)	Part Number:	D212-664-141
Inspection Dwg: D212-664-141 Rev: C		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

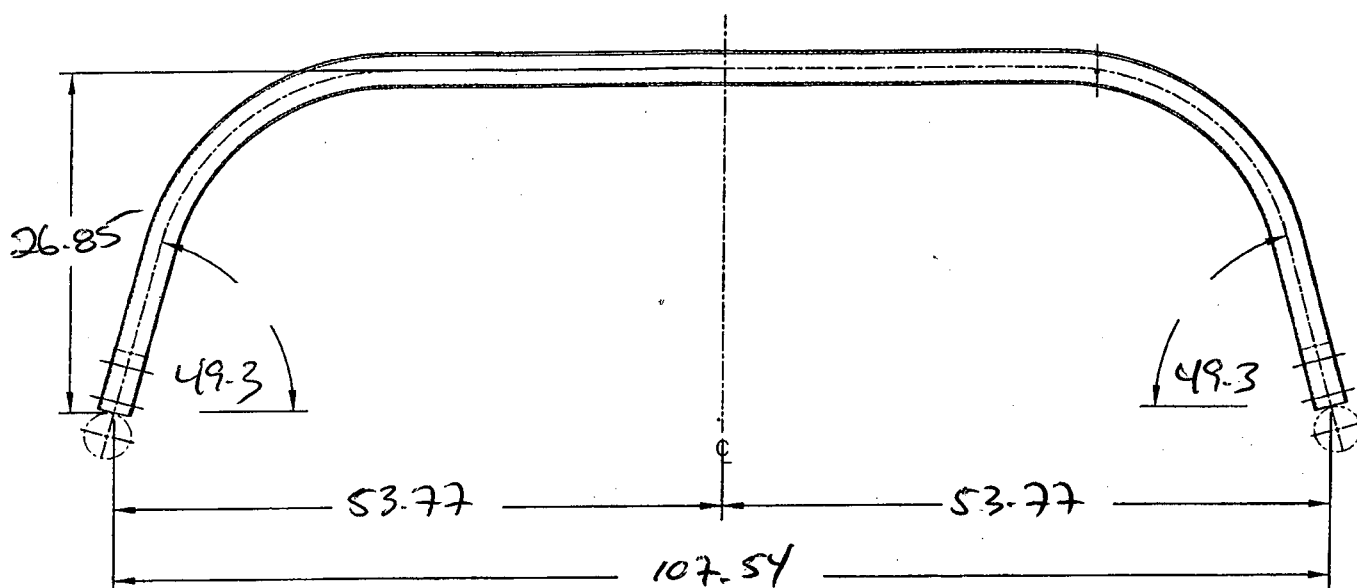
Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	0.200"	✓			
	R0.063	+/-0.010	0.063"	✓			
	2.740	+0.005/-0.000	2.743"	✓			
	5.097	+/-0.030	5.097"	✓			
	2.304	+0.005/-0.000	2.307"	✓			
	2.340	+0.005/-0.000	2.343"	✓			
	2.398	+0.005/-0.000	2.402"	✓			
	2.448	+0.005/-0.000	2.452"	✓			
	2.498	+0.005/-0.000	2.501"	✓			
	2.549	+0.005/-0.000	2.553"	✓			
	2.599	+0.005/-0.000	2.602"	✓			
	2.671	+0.005/-0.000	2.674"	✓			
	2.701	+0.005/-0.000	2.704"	✓			
SIDE B	0.200	+/-0.010	0.200"	✓			
	R0.063	+/-0.010	0.063"	✓			
	2.740	+0.005/-0.000	2.743"	✓			
	5.097	+/-0.030	5.112"	✓			
	2.304	+0.005/-0.000	2.308"	✓			
	2.340	+0.005/-0.000	2.344"	✓			
	2.398	+0.005/-0.000	2.402"	✓			
	2.448	+0.005/-0.000	2.452"	✓			
	2.498	+0.005/-0.000	2.501"	✓			
	2.549	+0.005/-0.000	2.553"	✓			
	2.599	+0.005/-0.000	2.603"	✓			
	2.671	+0.005/-0.000	2.674"	✓			
	2.701	+0.005/-0.000	2.704"	✓			
	126.51	+/-0.020	126.510"	✓			

Measured by: J.F.	Audited by: [Signature]	Prototype Approval:	N/A
Date: 07/09/25	Date: 07-09-26	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-101)	KJ/JLM	
B	06.03.15	Tolerance revised for 5.097 per Dwg Rev update	KJ/JLM	
C	07.05.28	Dwg Rev updated	KJ/JLM	[Signature]

DART AEROSPACE LTD		Work Order:	33534
Description: Crosstube High Fwd (205/212/412)		Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: C		Page 1 of 1	

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments

QC15 Inspection	<i>[Signature]</i>
Date	07-10-02

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	<i>[Signature]</i>
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM <i>[Signature]</i>	<i>[Signature]</i>

DART**RELEASED**

07.04.24

DESIGN PH	DRAWN BY PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED QD	APPROVED [Signature]	DRAWING NO. D212-664-141	REV. C SHEET 1 OF 3
DATE 07.03.08		TITLE XTUBE ASS'Y (205/212/412 HI FWD) NTS	
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	07.03.08	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	

Qty	Part Number	Description
X	D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
1	D6005-128	CROSSTUBE
2	D2893-1	SUPPORT
4	D3595-063-450	RUBBER CUSHION
4	MS21920-25	CLAMP (OR MS21920-26)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.51±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 10) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

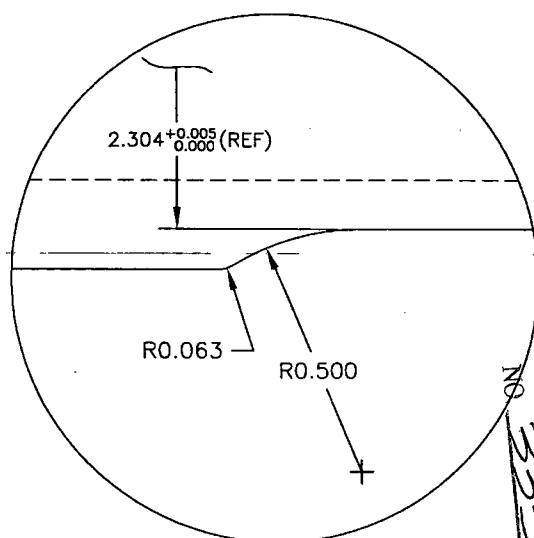
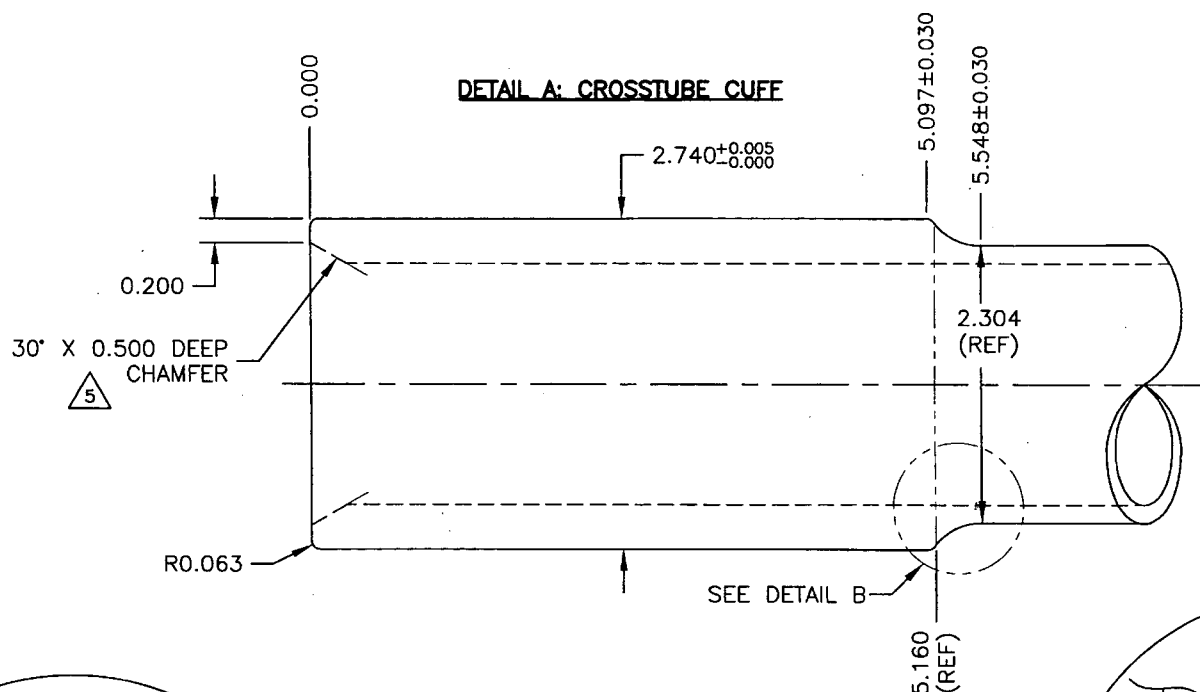
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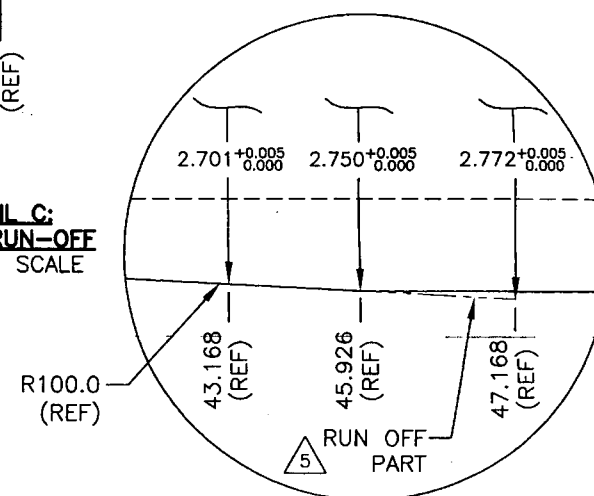
RELEASED
 67.04.24 (P)
 PER E.L.N. 887

DETAIL A: CROSSTUBE CUFF



**DETAIL B: CUFF
 TRANSITION
 SCALE 4:1**

**DETAIL C:
 TAPER RUN-OFF
 NOT TO SCALE**



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DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HAMPSHIRE, ONTARIO, CANADA
CHECKED J	APPROVED J	DRAWING NO. D212-664-141	REV. C SHEET 3 OF 3
DATE 07.03.08	TITLE XTUBE ASS'Y (205/212/412 HI FWD)	SCALE 1:1	



LIQUID PENETRANT TEST REPORT

P - 1180 1

CLIENT	DART AEROSPACE	DATE	OCT 5 2007	PAGE	1	OF	2
ATTENTION	LINDA LACELLE	ACUREN JOB No.	188 07 1180	TIME	AM <input type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	1270 ABERDEEN ST	PO/VO No.					
	HAWKESBURY, ONT.	WORK LOCATION	HAWKESBURY				
		ACCEPTANCE STD.	ASTM 1417/QSI-038	REV./DATE	2005		
PROJECT	206L AFT X TUBES, 212/205 HIGH FED X TUBE						
ITEM(S) EXAMINED	JOB #S 206L: 34141, 34142, 34143, 34216, 34483.						
	JOB #S 212/205: 33534, 33535, 33536, 33537.						

JOB DESCRIPTION	PROCEDURE No.	LT-0002	REV./DATE	TECHNIQUE No.	LT-TECH2	REV./DATE
PART No.	D206667203/D212664101		MATERIAL	ALODINED ALUM.		THICKNESS
SCOPE	WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE					

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LGHT8171	<input type="checkbox"/> OUTPUT > 1000 μ W/CM ²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANTZL67	MINIMUM DWELL TIME	45 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O	MINIMUM DRY TIME	> 10 MIN.	OTHER	CAL SEP 18 07	
DEVELOPER SKDS2	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	CAL DUE DATE	
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input checked="" type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS- (☐ METRIC ☒ IMPERIAL)

FLUORESCENT LIQUID PENETRANT INSPECTION
CARRIED OUT ON 100% EXTERNAL SURFACE ON:

206L AFT X TUBES JOB#S 34141, 34142,
34143, 34216, 34483.

212 HIGH FED X TUBE JOB#S 33534, 33535, 33536, 33537.

RESULTS: NO INDICATION OF DEFECTS.
ITEMS ACCEPTABLE TO STANDARD.

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner operator and the owner operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE		DTR # E 13169
TECHNICIAN (SIGNATURE):		REPORT REVIEWED BY:
NAME (PRINT):	JASON HEWETT	NAME INITIALS
	1 ST TECHNICIAN	2 ND TECHNICIAN
	CGSB LEVEL 2 SNT LEVEL	CGSB LEVEL SNT LEVEL
	CGSB REG. No 6156	CGSB REG. No

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